New Chemokine-Derived Therapeutics Targeting Stem Cell Migration

Grant Award Details

New Chemokine-Derived Therapeutics Targeting Stem Cell Migration

Grant Type: SEED Grant

Grant Number: RS1-00225

Investigator:

Name:	Ziwei Huang
Institution:	Sanford-Burnham Medical Research Institute
Type:	PI

Disease Focus: Neurological Disorders, Spinal Cord Injury, Stroke, Trauma

Human Stem Cell Use: Adult Stem Cell, Embryonic Stem Cell

Award Value: $708,000

Status: Closed

Progress Reports

Reporting Period: Year 2

View Report

Grant Application Details

Application Title: New Chemokine-Derived Therapeutics Targeting Stem Cell Migration

Public Abstract:	This proposal describes a sharply-focused, timely, and rigorous effort to develop new therapies for the treatment of injuries of the Central Nervous System (CNS). The underlying hypothesis for this proposal is that chemokines and their receptors (particularly those involved in inflammatory cascades) actually play important roles in mediating the directed migration of human neural stem cells (hNSCs) to, as well as engagement and interaction with, sites of CNS injury, and that understanding and manipulating the molecular mechanism of chemokine-mediated stem cell homing and engagement will lead to new, better targeted, more specific, and more efficacious chemokine-mediated stem cell-based repair strategies for CNS injury. In recent preliminary studies, we have discovered and demonstrated the important role of chemokine SDF-1-alpha and its receptor CXCR4 in mediating the directed migration of hNSCs to sites of CNS injury. To manipulate this SDF-1-alpha/CXCR4 pathway in stem cell migration, we have developed Synthetically and Modularly Modified Chemokines (SMM-chemokines) as highly potent and specific therapeutic leads. Here in this renewal application we propose to extend our research into a new area of stem cell biology and medicine involving chemokine receptors such as CXCR4 and its ligand SDF-1. Specifically, we will design more potent and specific analogs of SDF-1-alpha to direct the migration of beneficial stem cells toward the injury sites for the repair process.
Statement of Benefit to California:	This proposal describes a sharply-focused, timely, and rigorous effort to develop new therapies for the treatment of injuries of the Central Nervous System (CNS). CNS injuries and related disorders such as stroke, traumatic brain injury and spinal cord injury are significant health issues in the nation including the state of California. The new stem cell-based therapies to be developed from this application will have important clinical application in patients with these diseases in California.